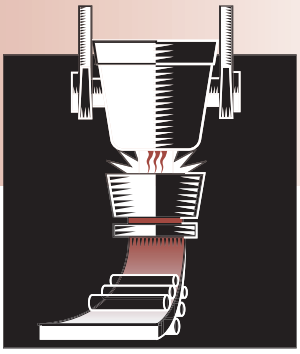
STEEL
Success Story



Portable Ultrasonic Inspection System for Testing Tubular Goods

New Ultrasound System Increases Accuracy and Reduces Cost of Quality Control Inspections

Benefits

- Costs less, is faster, and is more sensitive than other ultrasonic and electromagnetic test systems
- Eliminates initial installation of defective tubular material, cutting downtime for refits and increases well productivity. Higher throughput rate cuts inspection time for manufacturers and speeds testing in the field. Permits application of lighter wall tubular material by lowering risk of failure.
- Prevents piping failures and lowers the potential for hydrocarbon and chemical spills.

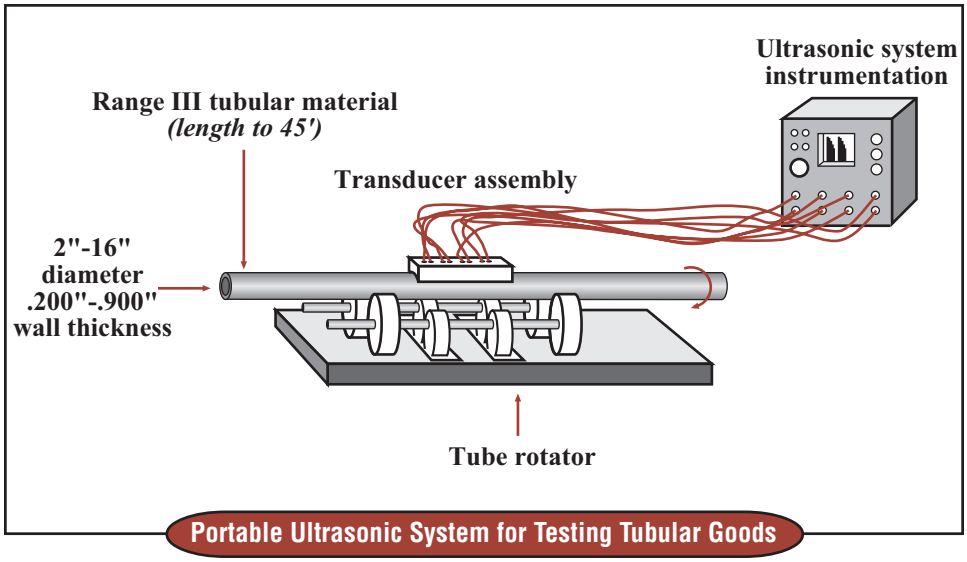
Applications

Manufacturing quality control for high-strength tubular goods and inspecting tubular material to maintain integrity and prevent spills in several industries, including oil and gas field exploration and production, refineries, and chemical plants

Capabilities

- Is an easy-to-install portable system with a large-diameter range
- Can be permanently installed in tube mills to verify product quality
- Can be installed in the field so end users can verify the quality of tubular goods before or after installation
- Has fully digital instrumentation

With a grant from the U.S. Department of Energy's Inventions and Innovation Program, Tubular Ultrasound, Inc., perfected and commercialized an inspection system to find imperfections and wall-thinning conditions in tubular goods used in critical applications (e.g., used by the oil and gas exploration and production industry and in refineries or chemical plants). The new test system uses ultrasound emission and detection to conduct tests on high-strength tubular goods. It replaces a radioactive test method and delivers more accurate results. It has also made improvements over existing ultrasonic and electromagnetic test systems. Because of the high throughput rate, tubular material manufacturers have readily accepted the tubular ultrasound system. In addition, end users have adopted the system because of its relatively low cost and portability. The system has fully digital instrumentation and is used in the United States and Europe.



Portable Ultrasonic System for Testing Tubular Goods

Technology Description

The portable ultrasonic inspection system uses EMAT (Electro-Magnetic Acoustic Transduction) sensors and electronics to produce ultrasound waves by means of an electromagnetic interaction with the tubular specimen being tested. The EMAT sensors generate selected ultrasonic Lamb waves, which then travel at the speed of sound around the circumference. Lamb waves are dispersive, which means that their phase and group velocity changes with wall thickness. Anomalies such as cracks, pits, or delaminations introduce amplitude and phase shifts in the propagating Lamb waves; and these phase shifts are measured by the system electronics. Software digitally monitors and displays the Lamb wave relative amplitude and phase using one or more selected time gates. The proprietary software also controls the inspection process and archives the test results.

System Economics and Market Potential

The portable ultrasonic inspection system (Total Inspection®) performs a full circumferential ultrasonic inspection on tubular material, from a single contact point, without couplant. The system performs 100% flaw detection reliably and repeatably. Detectable defects include cracks, pits, corrosion, laminations, and other discontinuities, regardless of their orientation or location within the material. Pipe sizes from 2" thru 16" can be examined. Pipe surfaces can be rough, dirty, or painted with little effect on sensitivity of the procedure.

The portable ultrasonic inspection system is superior to an electromagnetic inspection system in terms of its ability to detect internal defects and to inspect alloy materials. This is also the case when compared to alternative ultrasonic inspection systems regarding portability and placement at strategic locations, quality of inspection, and throughput rate. At this time, approximately 10 test systems are currently in operation and are sited in the U.S. Gulf Coast, primarily in the Houston area.

Tubular Ultrasound Inspection System

The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

"The Inventions and Innovation grant allowed Tubular Ultrasound to perfect and commercialize an inspection system which performs with a 100% flaw detection reliability in tubular goods."

– David Siverling, President
Tubular Ultrasound

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